

Appendix A

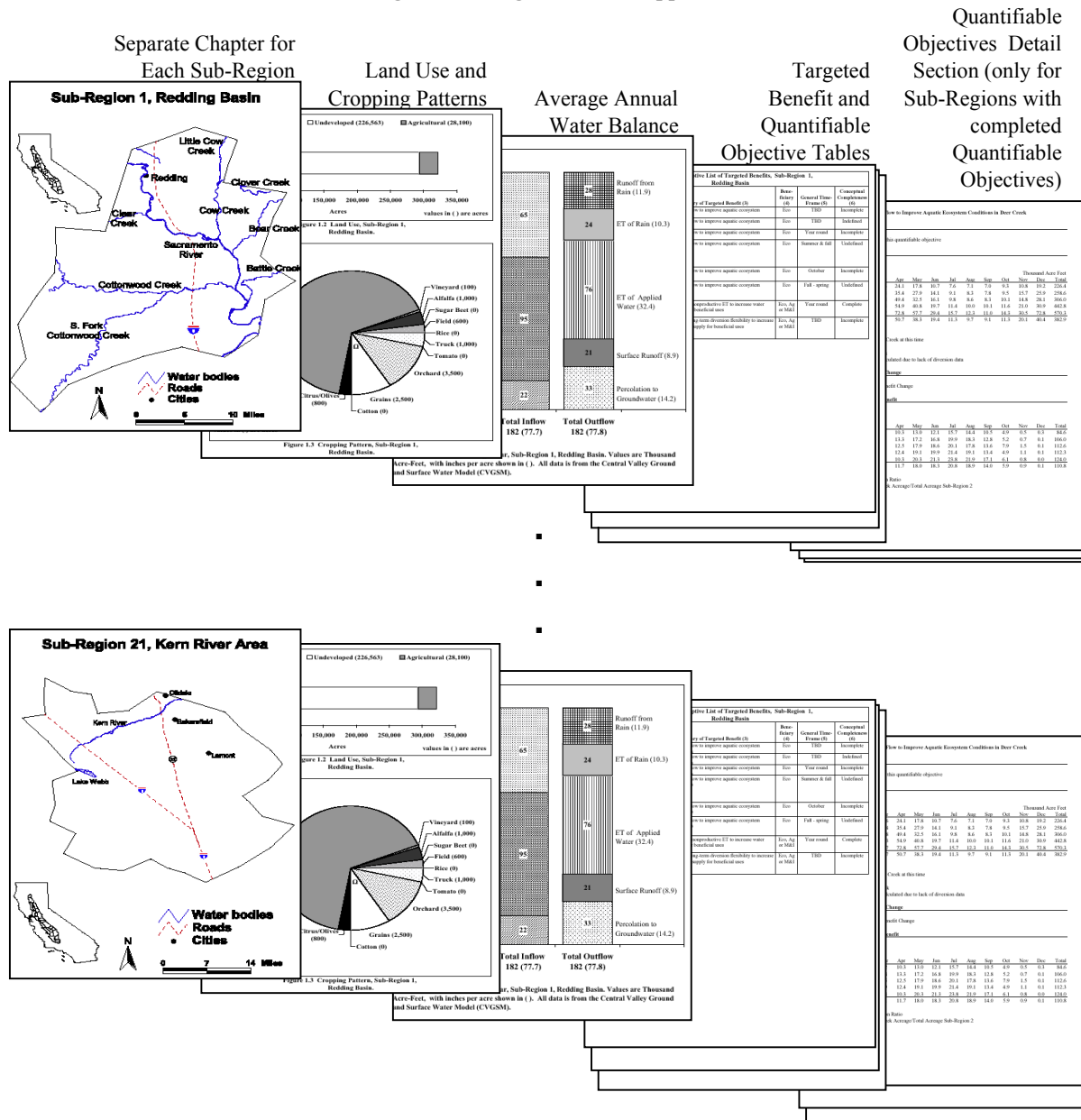
Complete List of Quantifiable Objectives by Sub-Region

Appendix A contains a list of the completed and potential Quantifiable Objectives (QOs). To-date, 196 potential QOs have been identified. Of these, approximately 50 have been completed. WUE proposals that incorporate completed QOs will be given extra weight in the selection process.

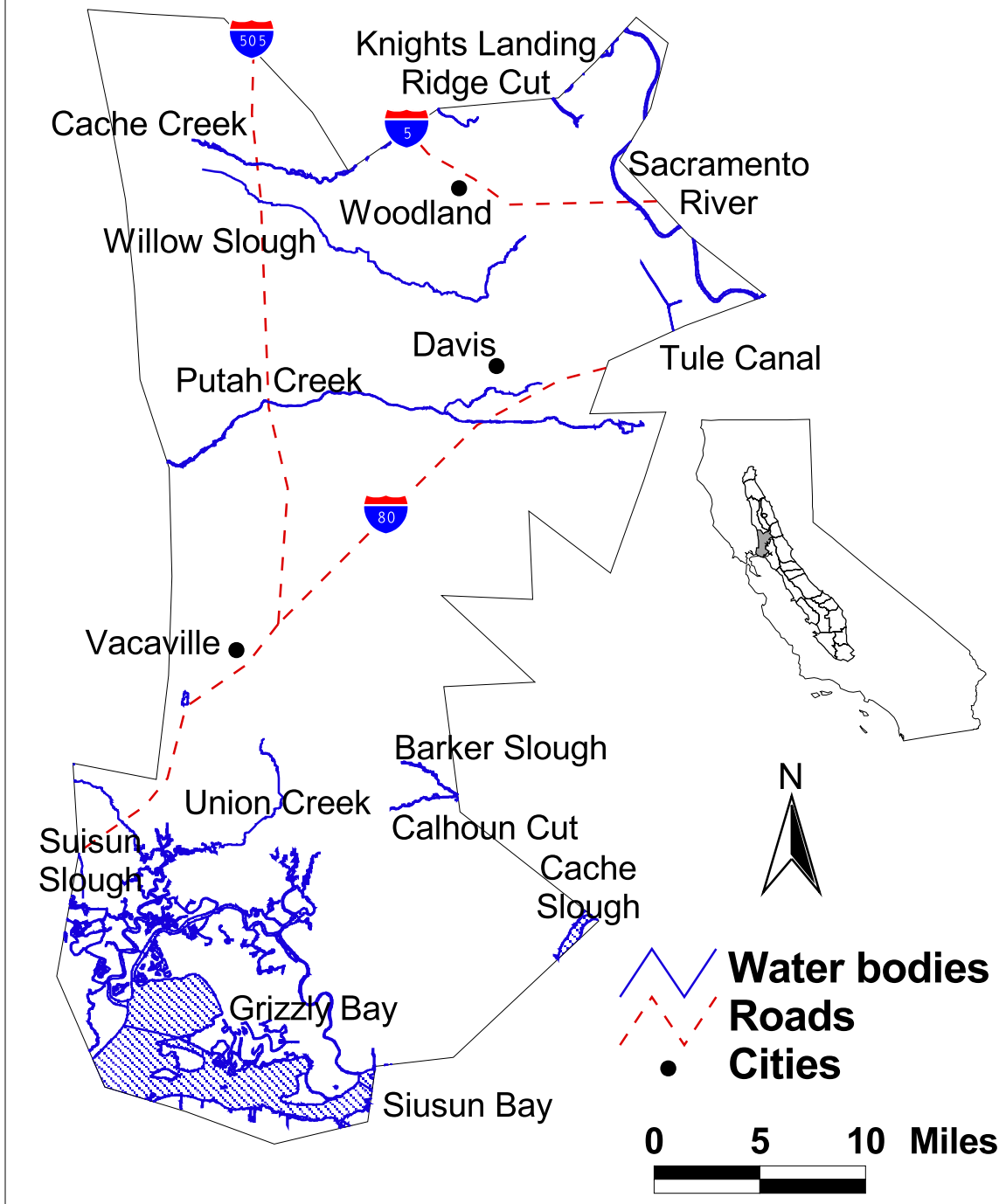
Readily available data does not exist to allow completion of the remaining QOs. However, approximately 45 of the uncompleted QOs have been identified as high priority, and proposals that are linked to these priority outcomes (or Targeted Benefits) will also receive extra weight in the selections (although not as much weight as those that incorporate completed QOs).

Appendix A is organized into 21 chapters that correspond to the 21 Sub-Regions defined in the QO analysis. Each chapter contains background information and details as illustrated in Figure A.I.

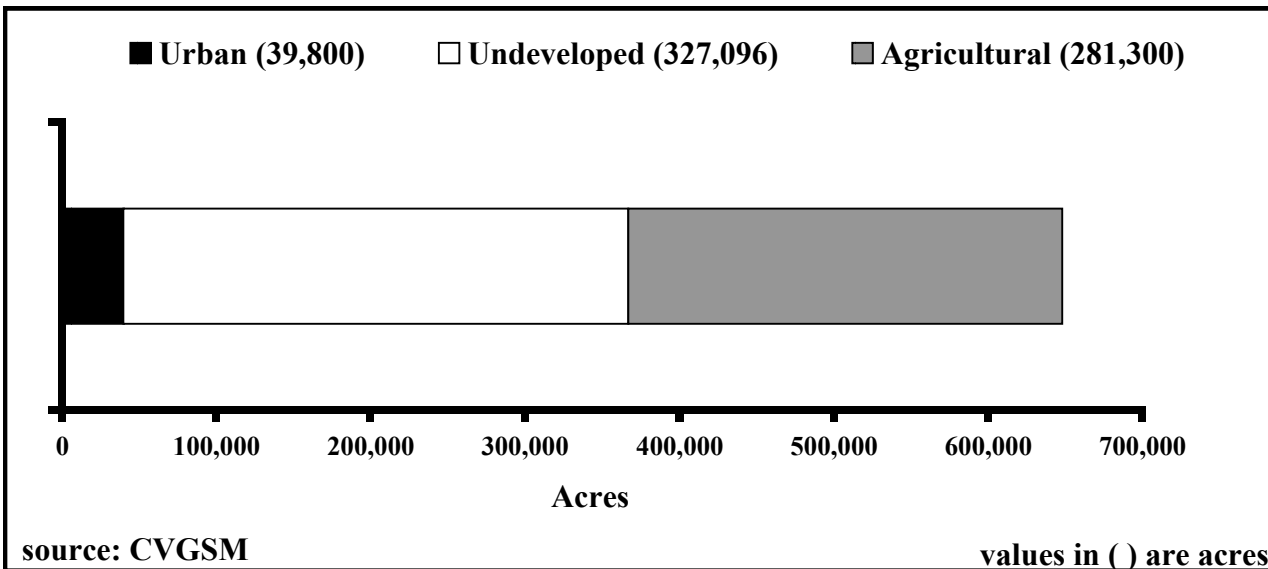
Figure A.I. Organization of Appendix A



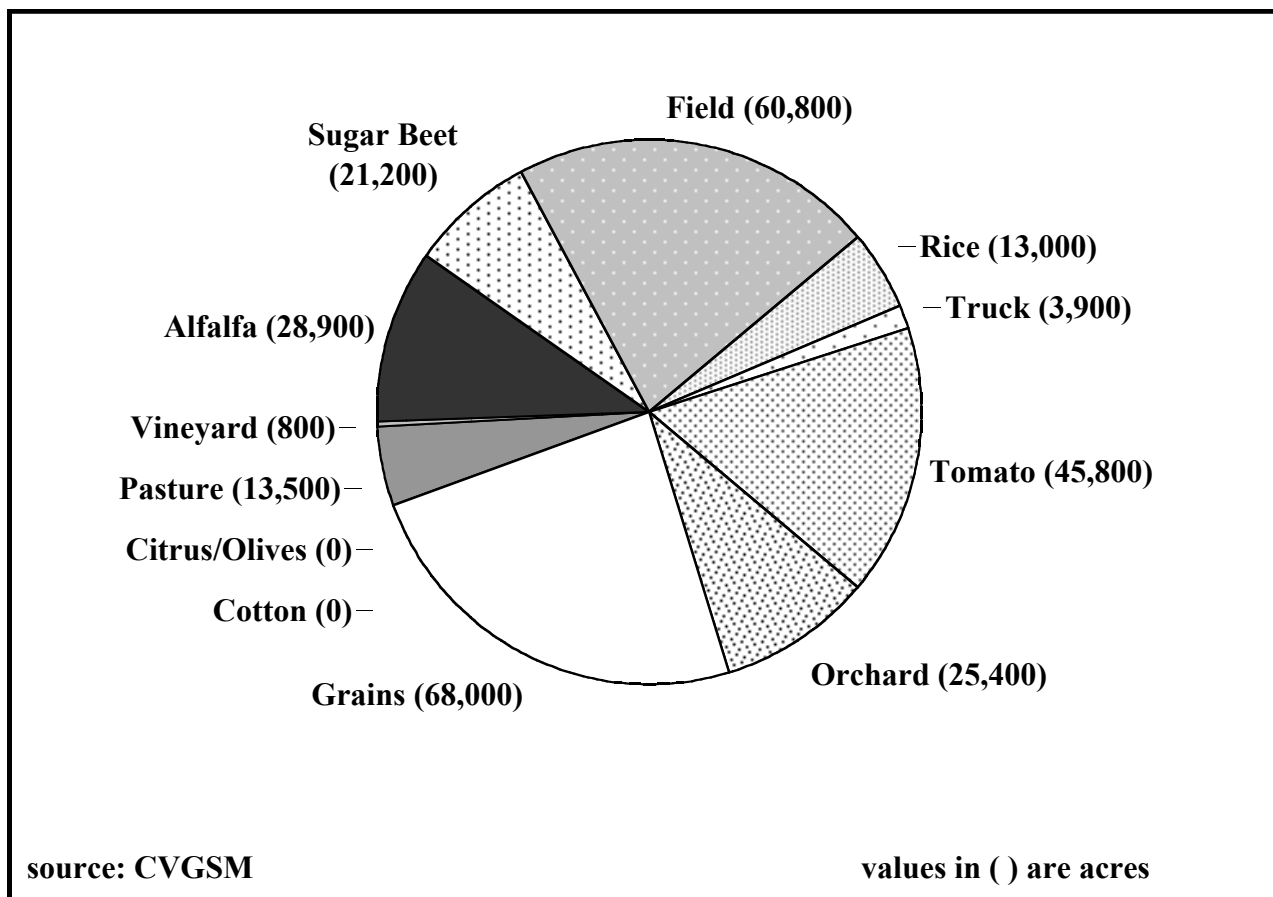
Sub-Region 6, Sacramento Valley Floor, Cache Creek, Putah Creek, and Yolo Bypass



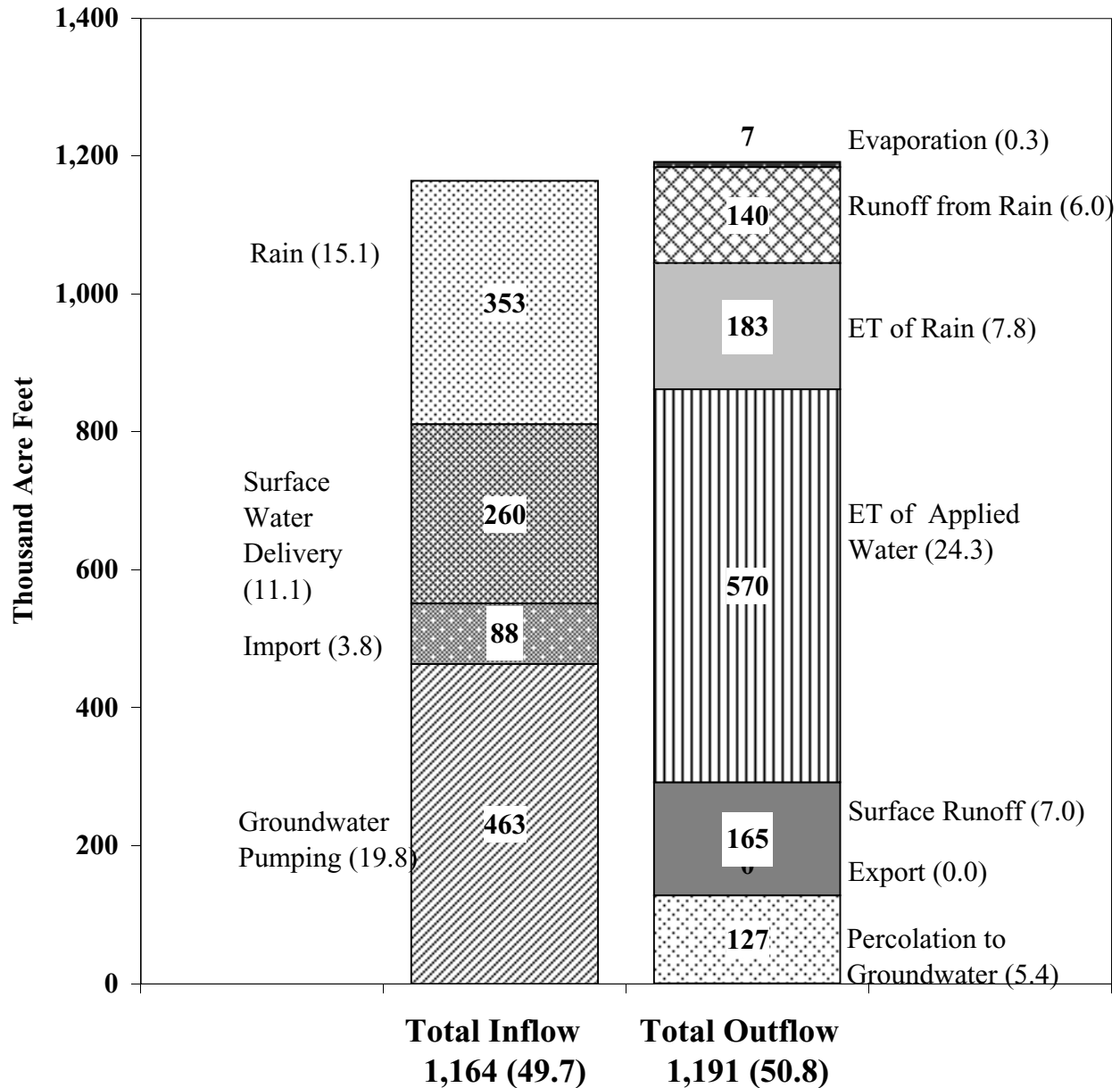
**Figure A.6.2 Land Use, Sub-Region 6,
Sacramento Valley Floor, Cache Creek, Putah Creek, and Yolo Bypass.**



**Figure A.6.3 Cropping Pattern, Sub-Region 6,
Sacramento Valley Floor, Cache Creek, Putah Creek, and Yolo Bypass.**



Sub-Region 6 Water Balance



Farm Water Balance, Average Year, Sub-Region 6, Sacramento Valley Floor, Cache Creek, Putah Creek, and Yolo Bypass. Values are Thousand Acre-Feet, with inches per acre shown in (). All data is from the Central Valley Ground and Surface Water Model (CVG)

**Table A.6.1. Descriptive List of Targeted Benefits, Sub-Region 6,
Sacramento Valley Floor, Cache Creek and Putah Creek and Yolo Bypass**

| TB # (1) [duplicate] | Location (2) | Category of Targeted Benefit (3) | Bene- ficiary (4) | General Time- Frame (5) | Conceptual Completeness (6) |
|---------------------------------|----------------------------|--|----------------------------------|--|--|
| 50 | Cache & Putah Creeks | Flow: Provide flow to improve aquatic ecosystem conditions | Eco | Year round | Incomplete |
| 51 | All suitable lands | Quantity: Provide long-term diversion flexibility to increase the water supply for beneficial uses | Eco, Ag or M&I | TBD | Incomplete |
| 52 [59] | Sacramento River | Quality: Reduce pesticides to enhance and maintain beneficial uses of water | Eco or M&I | TBD | Complete |
| 53 | All affected lands | Quantity: Decrease nonproductive ET to increase water supply for beneficial uses | Eco, Ag or M&I | Year round | Complete |
| 54 [27, 35, 48, 65, 73] | Wetlands | Quantity: Provide long-term diversion flexibility to increase the water supply for beneficial uses | Eco | Variable | Incomplete |

**Table A.6.2. Quantified Targeted Benefits, Sub-Region 6,
Sacramento Valley Floor, Cache Creek and Putah Creek and Yolo Bypass**

| TB # (1) [duplicate] | Source and Description of Quantified Targeted Benefit (7) |
|---------------------------------|---|
| 50 | ERPP: More closely emulate natural seasonal patterns in Cache and Putah Creeks by providing additional flows, when available from existing water supplies. Flows in the Yolo Bypass would be supplemented, as needed, by the Colusa basin drain through the Knights Landing Ridge Cut Canal, extending the Tehama-Colusa Canal, and the Sacramento River through the Fremont weir. Supplemental flows may be needed in fall if water temperature and flow in the lower Yolo Bypass are insufficient for passage from Cache Slough to upstream areas in the Sacramento River. Supplemental flows may be needed in winter and spring to sustain downstream migrating juvenile salmon and steelhead on their journey through the Yolo Bypass to the Delta. Supplemental flows would be needed along with irrigation water from spring to fall to sustain native fish, wetlands, and riparian habitats in channel sloughs of the Yolo Bypass. |
| 51 | Core: Enhance the effectiveness of potential conjunctive use programs by reducing flows to groundwater to _____ acre feet per year during periods of shortage; and increasing flows to groundwater to _____ acre feet per year during periods of excess. |
| 52 [59] | 303(d): Reduce diazinon to _____. |
| 53 | Core: Reduce unwanted ET by _____ acre-feet per year. |
| 54 [27, 35, 48, 65, 73] | ERPP/ Cooperatively manage _____ acres of ag lands and restore _____ acres of seasonal, semipermanent, and Core: permanent wetlands consistent with the CV Habitat Jt Venture and N. Am. Waterfowl Mgmt. Plan. |

**Table A.6.3. Quantified Targeted Benefit Change, Sub-Region 6,
Sacramento Valley Floor, Cache Creek and Putah Creek and Yolo Bypass**

| TB # (1) [duplicate] | Reference Condition | | Quantified Targeted Benefit | | Quantified Targeted Benefit Change | | | Specific Time-Frame (11) |
|-------------------------|---------------------|------------------|-----------------------------|-----------------------|------------------------------------|------------------|----------------------|--------------------------|
| | Data Source (8) | Availability (9) | Data Source (8) | Data Availability (9) | Data Source (8) | Availability (9) | Range of Values (10) | |
| 50 | CVGSM | Unproven-precise | ERPP | Not available | Not available | Not available | Not available | Year round |
| 51 | CVGSM | Unproven-precise | Core | Rough estimate | Calculated | Rough estimate | TBD | TBD |
| 52 [59] | TBD | TBD | TBD | Proven - precise | Calculated | TBD | TBD | TBD |
| 53 | CVGSM | Unproven-precise | Core | Rough estimate | Calculated | Rough estimate | 5 TAF/yr | TBD |
| 54 [27, 35, 48, 65, 73] | ERPP | TBD | ERPP | TBD | Calculated | TBD | <1 TAF/yr | TBD |

**Table A.6.4. Quantifiable Objective, Sub-Region 6,
Sacramento Valley Floor, Cache Creek and Putah Creek and Yolo Bypass**

| TB # (1) [duplicate] | Achievable Agricultural Potential (12) | Quantifiable Objective (13) |
|---------------------------------|---|---|
| 50 | TBD | TBD |
| 51 | TBD | TBD |
| 52 [59] | TBD | TBD |
| 53 | 5 TAF per year plus additional water generated through reduction in application through improved irrigation systems | 5 TAF per year plus additional water generated through reduction in application through improved irrigation systems |
| 54 [27, 35, 48, 65, 73] | <1 TAF per year | <1 TAF per year |

**Table A.6.5. Affected Flow Paths and Possible Actions, Sub-Region 6,
Sacramento Valley Floor, Cache Creek and Putah Creek and Yolo Bypass**

| TB # (1) [duplicate] | Affected Flow Paths (14) | Possible Actions (provided as examples; proposers are encouraged to consider local actions that are not listed) (15) |
|---------------------------------|---|--|
| 50 | TBD | TBD |
| 51 | TBD | TBD |
| 52 [59] | Surface and Groundwater Return | cover crop, furrow or field diking and reduction in late season irrigation. Note: significant contributions to this TB can also be made through changes in chemical applications that are outside the scope of AgWUE. |
| 53 | ETAW | Reduce ET flows using improved irrigation methods, such as drip irrigation, and planting densities. |
| 54 [27, 35, 48, 65, 73] | Surface water return and Percolation to Groundwater: | Improve farm irrigation management (such as irrigation scheduling) and more uniform irrigation methods (such as shorter furrows, sprinkler, or drip). Reduction in operational spill through improved management, canal automation or regulatory storage. Reduction in canal seepage through canal lining or piping. |

Detail 53, Decrease Nonproductive ET, SubRegion 6

Step 1. Quantified Targets

A. Acreage Assumed for Reduction of Nonproductive ET

source: CVGSM Sub-Region 6

| Crop | Potential for ET Red. | Existing | Assumed for ET Reduction* | |
|-------------------|-----------------------|----------|---------------------------|---------|
| | | | acres | percent |
| Pasture | No | 13,500 | 0 | 0% |
| Alfalfa | No | 28,900 | 0 | 0% |
| Sugar Beet | No | 21,200 | 0 | 0% |
| Field | No | 60,800 | 0 | 0% |
| Rice | No | 13,000 | 0 | 0% |
| Truck | Yes | 3,900 | 1,170 | 30% |
| Tomato | Yes | 45,800 | 13,740 | 30% |
| Orchard | Yes | 25,400 | 7,620 | 30% |
| Grains | No | 68,000 | 0 | 0% |
| Vineyard | Yes | 800 | 240 | 30% |
| Cotton | No | 0 | 0 | 0% |
| Citrus and Olives | Yes | 0 | 0 | 0% |
| Total | | 281,300 | 22,770 | 8% |

*The Assumed Acreage for ET Reduction is 30% of the crops that have the Potential for ET Reduction.

B. Existing ET for Sub-Region 6

source: CVGSM

| Crop | | | | | | | | | | | | | Inches |
|-------------------|------|------|------|------|------|------|------|------|------|------|------|------|--------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| Pasture | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Alfalfa | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Sugar Beet | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Field | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Rice | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Truck | 0.00 | 0.00 | 0.00 | 1.90 | 1.00 | 2.00 | 3.70 | 6.60 | 4.60 | 1.00 | 0.00 | 0.00 | 20.80 |
| Tomato | 0.00 | 0.00 | 0.00 | 1.90 | 3.20 | 6.90 | 8.50 | 5.40 | 2.70 | 0.00 | 0.00 | 0.00 | 28.60 |
| Orchard | 1.00 | 1.80 | 3.00 | 2.80 | 4.50 | 6.00 | 7.00 | 5.90 | 4.40 | 2.60 | 1.60 | 1.00 | 41.60 |
| Grains | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Vineyard | 0.00 | 0.00 | 0.00 | 2.32 | 3.70 | 4.85 | 5.80 | 4.52 | 3.25 | 1.97 | 0.00 | 0.00 | 26.41 |
| Cotton | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Citrus and Olives | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | --- |
| Total | 0.33 | 0.60 | 1.00 | 2.21 | 3.53 | 6.33 | 7.72 | 5.62 | 3.37 | 0.94 | 0.54 | 0.33 | 32.53 |

C. ET from Rain for Sub-Region 6

source: CVGSM

| | | | | | | | | | | | | | Inches |
|-------------|------|------|------|------|------|------|------|------|------|------|------|------|--------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | 0.59 | 0.82 | 0.73 | 0.00 | 0.14 | 0.16 | 0.06 | 0.34 | 0.67 | 1.52 | 0.88 | 0.60 | 6.51 |
| 2) Dry | 0.66 | 1.02 | 1.26 | 0.52 | 0.00 | 0.00 | 0.17 | 0.56 | 1.01 | 1.39 | 0.96 | 0.67 | 8.22 |
| 3) B Norm | 0.66 | 1.06 | 1.31 | 0.36 | 0.00 | 0.00 | 0.33 | 0.53 | 1.01 | 1.61 | 0.96 | 0.66 | 8.50 |
| 4) A Norm | 0.67 | 1.10 | 1.62 | 0.87 | 0.00 | 0.00 | 0.07 | 0.56 | 0.96 | 1.68 | 0.92 | 0.66 | 9.09 |
| 5) Wet | 0.68 | 1.09 | 1.53 | 1.31 | 0.00 | 0.00 | 0.00 | 0.63 | 0.97 | 1.81 | 1.03 | 0.68 | 9.73 |
| Wtd Avg. | 0.66 | 1.03 | 1.33 | 0.71 | 0.02 | 0.02 | 0.12 | 0.55 | 0.95 | 1.62 | 0.97 | 0.66 | 8.63 |

D. Existing ETAW for Sub-Region 6

| source: calculated = Step 1B.(Average Total) - Step 1C., (set to 0 if Step 1B. - Step 1C. <0) | | | | | | | | | | | | | Inches |
|---|------|------|------|------|------|------|------|------|------|------|------|------|--------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | 0.00 | 0.00 | 0.27 | 2.21 | 3.38 | 6.17 | 7.67 | 5.28 | 2.71 | 0.00 | 0.00 | 0.00 | 27.68 |
| 2) Dry | 0.00 | 0.00 | 0.00 | 1.69 | 3.53 | 6.33 | 7.55 | 5.06 | 2.37 | 0.00 | 0.00 | 0.00 | 26.52 |
| 3) B Norm | 0.00 | 0.00 | 0.00 | 1.84 | 3.53 | 6.33 | 7.39 | 5.09 | 2.36 | 0.00 | 0.00 | 0.00 | 26.54 |
| 4) A Norm | 0.00 | 0.00 | 0.00 | 1.34 | 3.53 | 6.33 | 7.66 | 5.06 | 2.42 | 0.00 | 0.00 | 0.00 | 26.33 |
| 5) Wet | 0.00 | 0.00 | 0.00 | 0.90 | 3.53 | 6.33 | 7.72 | 4.99 | 2.40 | 0.00 | 0.00 | 0.00 | 25.86 |
| Wtd Avg. | 0.00 | 0.00 | 0.04 | 1.50 | 3.51 | 6.31 | 7.60 | 5.07 | 2.43 | 0.00 | 0.00 | 0.00 | 26.45 |

E. Target ETAW for Sub-Region 6

| source: calculated = Step 1D. * 90% | | | | | | | | | | | | | Inches |
|-------------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|--------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | 0.00 | 0.00 | 0.24 | 1.99 | 3.04 | 5.55 | 6.90 | 4.75 | 2.44 | 0.00 | 0.00 | 0.00 | 24.91 |
| 2) Dry | 0.00 | 0.00 | 0.00 | 1.52 | 3.17 | 5.69 | 6.80 | 4.55 | 2.13 | 0.00 | 0.00 | 0.00 | 23.87 |
| 3) B Norm | 0.00 | 0.00 | 0.00 | 1.66 | 3.17 | 5.69 | 6.65 | 4.58 | 2.12 | 0.00 | 0.00 | 0.00 | 23.88 |
| 4) A Norm | 0.00 | 0.00 | 0.00 | 1.21 | 3.17 | 5.69 | 6.89 | 4.56 | 2.18 | 0.00 | 0.00 | 0.00 | 23.70 |
| 5) Wet | 0.00 | 0.00 | 0.00 | 0.81 | 3.17 | 5.69 | 6.95 | 4.49 | 2.16 | 0.00 | 0.00 | 0.00 | 23.27 |
| Wtd Avg. | 0.00 | 0.00 | 0.03 | 1.35 | 3.16 | 5.67 | 6.84 | 4.56 | 2.18 | 0.00 | 0.00 | 0.00 | 23.80 |

Step 2. Reference Condition

For ET Reduction the Reference Condition is the existing Crop ET, Step 1B.

Step 3. Quantified Targeted Benefit Change

A. Quantified Targeted Benefit Change for Sub-Region 6

| source: calculated = Step 1D - Step 1E | | | | | | | | | | | | | Inches |
|--|-----|-----|-----|------|------|------|------|------|------|-----|-----|-----|--------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | --- | --- | --- | 0.22 | 0.34 | 0.62 | 0.77 | 0.53 | 0.27 | --- | --- | --- | 2.74 |
| 2) Dry | --- | --- | --- | 0.17 | 0.35 | 0.63 | 0.76 | 0.51 | 0.24 | --- | --- | --- | 2.65 |
| 3) B Norm | --- | --- | --- | 0.18 | 0.35 | 0.63 | 0.74 | 0.51 | 0.24 | --- | --- | --- | 2.65 |
| 4) A Norm | --- | --- | --- | 0.13 | 0.35 | 0.63 | 0.77 | 0.51 | 0.24 | --- | --- | --- | 2.63 |
| 5) Wet | --- | --- | --- | 0.09 | 0.35 | 0.63 | 0.77 | 0.50 | 0.24 | --- | --- | --- | 2.59 |
| Wtd Avg. | --- | --- | --- | 0.15 | 0.35 | 0.63 | 0.76 | 0.51 | 0.24 | --- | --- | --- | 2.64 |

B. Quantified Targeted Benefit Change for Sub-Region 6

| source: calculated = Step 1D - Step 1E | | | | | | | | | | | | | Thousand Acre Feet |
|--|-----|-----|-----|------|------|------|------|------|------|-----|-----|-----|--------------------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | --- | --- | --- | 0.42 | 0.64 | 1.17 | 1.45 | 1.00 | 0.51 | --- | --- | --- | 5.2 |
| 2) Dry | --- | --- | --- | 0.32 | 0.67 | 1.20 | 1.43 | 0.96 | 0.45 | --- | --- | --- | 5.0 |
| 3) B Norm | --- | --- | --- | 0.35 | 0.67 | 1.20 | 1.40 | 0.97 | 0.45 | --- | --- | --- | 5.0 |
| 4) A Norm | --- | --- | --- | 0.25 | 0.67 | 1.20 | 1.45 | 0.96 | 0.46 | --- | --- | --- | 5.0 |
| 5) Wet | --- | --- | --- | 0.17 | 0.67 | 1.20 | 1.47 | 0.95 | 0.46 | --- | --- | --- | 4.9 |
| Wtd Avg. | --- | --- | --- | 0.28 | 0.67 | 1.20 | 1.44 | 0.96 | 0.46 | --- | --- | --- | 5.0 |

Step 4. Area Affected by Targeted Benefit

Area affected are the 22,770 acres identified in Step 1A.

Step 5. Water Flow Path Elements

The flow path elements used in this analysis are given in Step 1.

Step 6. Idealized Agricultural Potential

Additional ET research is required to determine this component.

Step 7. Achievable Agricultural Potential

The farm Available Agricultural Potential is the same as Step 3B.

Step 8. Quantifiable Objective

A. For ET Reduction the Quantifiable Objective is Step 3B

Detail 54, Provide long-term diversion flexibility to increase the water supply for beneficial uses.

Step 1. Quantified Targets

A. Percentage of Subregion 6 in each Wetland Region

source: GIS analysis

| Basin | Basin Acres | Sub-Region 6 Acres | Ratio Acreage in Sub-Region to Total Acreage |
|-------------|-------------|--------------------|--|
| Colusa | 1,100,765 | 39,542 | 0.04 |
| Butte | 574,618 | 1 | -- |
| Sutter | 224,142 | 69 | -- |
| American | 517,893 | 5,703 | 0.01 |
| Yolo | 514,963 | 460,250 | 0.89 |
| Delta | 1,332,584 | 2,724 | -- |
| Suisun | 99,311 | 99,276 | 1.00 |
| San Joaquin | 1,877,034 | 1 | -- |
| Tulare | 3,523,884 | 1 | -- |

B. Annual Water Need for Optimum Habitat by Wetland Type

source: Central Valley Wetlands Water Supply Investigations (August, 2000)

| Basin | Seasonal Wetlands | Semi-Permanent Wetlands | Permanent Wetlands | Annual Total |
|---------------------|-------------------|-------------------------|--------------------|--------------|
| -----Acre Feet----- | | | | |
| Colusa | 43,435 | 7,563 | 6,771 | 57,769 |
| Butte | 72,923 | 11,337 | 10,150 | 94,410 |
| Sutter | 469 | 81 | 73 | 622 |
| American | 5,695 | 992 | 888 | 7,575 |
| Yolo | 25,755 | 4,484 | 4,015 | 34,254 |
| Delta | 10,053 | 1,843 | 1,650 | 13,546 |
| Suisun | 119,995 | 21,993 | 19,690 | 161,677 |
| San Joaq. | 188,480 | 20,663 | 15,856 | 225,000 |
| Tulare | 15,640 | 1,854 | 1,415 | 18,908 |

C. Fraction of Water Need Requirements by Month as a Percentage of Total Water Need- Seasonal Wetlands

source: Central Valley Wetlands Water Supply Investigations (August, 2000)

| Basin | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|-----------|------|------|------|------|------|------|------|------|------|------|------|------|-------|
| Colusa | 0.04 | 0.04 | 0.04 | 0.00 | 0.14 | 0.00 | 0.00 | 0.18 | 0.36 | 0.08 | 0.08 | 0.04 | 1.0 |
| Butte | 0.04 | 0.04 | 0.04 | 0.00 | 0.18 | 0.00 | 0.00 | 0.16 | 0.36 | 0.09 | 0.07 | 0.04 | 1.0 |
| Sutter | 0.04 | 0.04 | 0.04 | 0.00 | 0.14 | 0.00 | 0.00 | 0.18 | 0.36 | 0.08 | 0.08 | 0.04 | 1.0 |
| American | 0.04 | 0.04 | 0.04 | 0.00 | 0.14 | 0.00 | 0.00 | 0.18 | 0.36 | 0.08 | 0.08 | 0.04 | 1.0 |
| Yolo | 0.04 | 0.04 | 0.04 | 0.00 | 0.14 | 0.00 | 0.00 | 0.18 | 0.36 | 0.08 | 0.08 | 0.04 | 1.0 |
| Delta | 0.04 | 0.04 | 0.04 | 0.05 | 0.00 | 0.00 | 0.00 | 0.19 | 0.42 | 0.08 | 0.08 | 0.04 | 1.0 |
| Suisun | 0.04 | 0.04 | 0.04 | 0.05 | 0.00 | 0.00 | 0.00 | 0.19 | 0.42 | 0.08 | 0.08 | 0.04 | 1.0 |
| San Joaq. | 0.04 | 0.04 | 0.00 | 0.00 | 0.15 | 0.05 | 0.00 | 0.15 | 0.38 | 0.08 | 0.08 | 0.04 | 1.0 |
| Tulare | 0.04 | 0.04 | 0.00 | 0.15 | 0.00 | 0.11 | 0.00 | 0.09 | 0.38 | 0.08 | 0.08 | 0.04 | 1.0 |

D. Fraction of Water Need Requirements by Month as a Percentage of Total Water Need- Semi-Permanent Wetlands
source: Central Valley Wetlands Water Supply Investigations (August, 2000)

| Basin | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|-------|
| Colusa | 0.03 | 0.03 | 0.05 | 0.07 | 0.07 | 0.14 | 0.14 | 0.00 | 0.00 | 0.41 | 0.05 | 0.03 | 1.0 |
| Butte | 0.03 | 0.03 | 0.05 | 0.07 | 0.07 | 0.14 | 0.14 | 0.00 | 0.00 | 0.41 | 0.05 | 0.03 | 1.0 |
| Sutter | 0.03 | 0.03 | 0.05 | 0.07 | 0.07 | 0.14 | 0.14 | 0.00 | 0.00 | 0.41 | 0.05 | 0.03 | 1.0 |
| American | 0.03 | 0.03 | 0.05 | 0.07 | 0.07 | 0.14 | 0.14 | 0.00 | 0.00 | 0.41 | 0.05 | 0.03 | 1.0 |
| Yolo | 0.03 | 0.03 | 0.05 | 0.07 | 0.07 | 0.14 | 0.14 | 0.00 | 0.00 | 0.41 | 0.05 | 0.03 | 1.0 |
| Delta | 0.03 | 0.03 | 0.05 | 0.07 | 0.07 | 0.14 | 0.14 | 0.00 | 0.00 | 0.41 | 0.05 | 0.03 | 1.0 |
| Suisun | 0.03 | 0.03 | 0.05 | 0.07 | 0.07 | 0.14 | 0.14 | 0.00 | 0.00 | 0.41 | 0.05 | 0.03 | 1.0 |
| San Joa. | 0.03 | 0.03 | 0.05 | 0.07 | 0.07 | 0.14 | 0.14 | 0.00 | 0.00 | 0.41 | 0.05 | 0.03 | 1.0 |
| Tulare | 0.03 | 0.04 | 0.06 | 0.08 | 0.08 | 0.13 | 0.13 | 0.00 | 0.00 | 0.38 | 0.06 | 0.04 | 1.0 |

E. Fraction of Water Need Requirements by Month as a Percentage of Total Water Need- Permanent Wetlands
source: Central Valley Wetlands Water Supply Investigations (August, 2000)

| Basin | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|----------|------|------|------|------|------|------|------|------|------|------|------|------|-------|
| Colusa | 0.02 | 0.02 | 0.04 | 0.08 | 0.11 | 0.15 | 0.15 | 0.15 | 0.13 | 0.08 | 0.06 | 0.02 | 1.0 |
| Butte | 0.02 | 0.02 | 0.04 | 0.08 | 0.11 | 0.15 | 0.15 | 0.15 | 0.13 | 0.08 | 0.06 | 0.02 | 1.0 |
| Sutter | 0.02 | 0.02 | 0.04 | 0.08 | 0.11 | 0.15 | 0.15 | 0.15 | 0.13 | 0.08 | 0.06 | 0.02 | 1.0 |
| American | 0.02 | 0.02 | 0.04 | 0.08 | 0.11 | 0.15 | 0.15 | 0.15 | 0.13 | 0.08 | 0.06 | 0.02 | 1.0 |
| Yolo | 0.02 | 0.02 | 0.04 | 0.08 | 0.11 | 0.15 | 0.15 | 0.15 | 0.13 | 0.08 | 0.06 | 0.02 | 1.0 |
| Delta | 0.02 | 0.02 | 0.04 | 0.08 | 0.11 | 0.15 | 0.15 | 0.15 | 0.13 | 0.08 | 0.06 | 0.02 | 1.0 |
| Suisun | 0.02 | 0.02 | 0.04 | 0.08 | 0.11 | 0.15 | 0.15 | 0.15 | 0.13 | 0.08 | 0.06 | 0.02 | 1.0 |
| San Joa. | 0.02 | 0.02 | 0.04 | 0.08 | 0.11 | 0.15 | 0.15 | 0.15 | 0.13 | 0.08 | 0.06 | 0.02 | 1.0 |
| Tulare | 0.02 | 0.02 | 0.04 | 0.08 | 0.11 | 0.15 | 0.15 | 0.15 | 0.13 | 0.08 | 0.06 | 0.02 | 1.0 |

F. Target Water Application for Private Wetlands in Sub-Region 6

source: calculated using Step1A through Step 1E

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|-------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|-----|-------|
| Seasonal | 6.0 | 6.0 | 6.0 | 6.3 | 3.4 | - | - | 27.2 | 59.4 | 12.1 | 12.1 | 6.0 | 144.6 |
| Semi-Perman | 0.7 | 0.7 | 1.4 | 1.8 | 1.8 | 3.6 | 3.6 | - | - | 10.7 | 1.4 | 0.7 | 26.3 |
| Permanent | 0.4 | 0.4 | 0.9 | 1.8 | 2.7 | 3.6 | 3.6 | 3.6 | 3.1 | 1.8 | 1.3 | 0.4 | 23.5 |
| Total | 7.2 | 7.2 | 8.3 | 9.9 | 7.9 | 7.1 | 7.1 | 30.7 | 62.5 | 24.5 | 14.8 | 7.2 | 194.4 |

Step 2. Reference Condition

A. Annual Available Water Supply by Wetland Type

source: Central Valley Wetlands Water Supply Investigations

| Basin | Wetlands | Wetlands | Permanent Wetlands | Total |
|-------------|---------------------|----------|--------------------|---------|
| | -----Acre Feet----- | | | |
| Colusa | 36,601 | 6,625 | 6,101 | 49,327 |
| Butte | 57,797 | 9,261 | 8,667 | 75,725 |
| Sutter | 355 | 66 | 62 | 483 |
| American | 4,328 | 804 | 754 | 5,886 |
| Yolo | 25,755 | 4,484 | 4,015 | 34,254 |
| Delta | 10,053 | 1,843 | 1,650 | 13,546 |
| Suisun | 119,995 | 21,993 | 19,690 | 161,678 |
| San Joaquin | 181,676 | 19,922 | 15,403 | 217,001 |
| Tulare | 15,181 | 1,802 | 1,373 | 18,356 |

B. Available Water for Private Wetlands in Sub-Region 6

source: calculated based on Step 2A and steps 1A,1C,1D, and 1E

| | Thousand Acre Feet | | | | | | | | | | | | |
|------------|--------------------|-----|-----|-----|-----|-----|-----|------|------|------|------|-----|-------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| Seasonal | 6.0 | 6.0 | 6.0 | 6.3 | 3.4 | - | - | 27.1 | 59.3 | 12.1 | 12.1 | 6.0 | 144.3 |
| Semi-Perm. | 0.7 | 0.7 | 1.4 | 1.8 | 1.8 | 3.5 | 3.5 | - | - | 10.6 | 1.4 | 0.7 | 26.2 |
| Permanent | 0.4 | 0.4 | 0.9 | 1.8 | 2.7 | 3.5 | 3.5 | 3.5 | 3.1 | 1.8 | 1.3 | 0.4 | 23.5 |
| Total | 7.2 | 7.2 | 8.3 | 9.9 | 7.8 | 7.1 | 7.1 | 30.7 | 62.4 | 24.5 | 14.8 | 7.2 | 194.1 |

Step 3. Quantified Targeted Benefit Change

A. Additional Water Required for Optimum Management of Private Wetlands in Sub-Region

source: calculated: Step 1F- Step 2B

| | Thousand Acre Feet | | | | | | | | | | | | |
|------------|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| Seasonal | 0.0 | 0.0 | 0.0 | - | 0.0 | - | - | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.3 |
| Semi-Perm. | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | - | - | 0.0 | 0.0 | 0.0 | 0.0 |
| Permanent | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Total | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.3 |

Step 4. Area Affected By Targeted Benefit

This analysis assumes that all of the agricultural lands in the sub-region could potentially contribute to the provision of additional waters for wetlands.

Step 5. Water Flow Path Elements

A. Rain Sub-Region (inflow)

source: CVGSM Sub-Region 6

| | Flow Path Not Affected Thousand Acre Feet | | | | | | | | | | | | |
|-------------|--|------|------|------|-----|-----|------|------|------|------|------|------|-------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | 28.1 | 32.0 | 32.6 | 8.9 | 5.2 | 4.4 | 1.0 | 11.7 | 20.8 | 25.0 | 24.5 | 28.9 | 223.2 |
| 2) Dry | 33.1 | 31.6 | 25.1 | 17.1 | 6.0 | 5.1 | 6.4 | 22.1 | 36.9 | 30.0 | 41.0 | 51.7 | 306.4 |
| 3) B Norm | 39.3 | 38.0 | 30.5 | 17.6 | 4.2 | 4.2 | 13.7 | 23.1 | 30.5 | 39.5 | 53.9 | 37.5 | 332.0 |
| 4) A Norm | 54.2 | 59.1 | 28.4 | 12.2 | 5.5 | 1.3 | 8.1 | 22.4 | 33.9 | 66.4 | 73.5 | 53.4 | 418.3 |
| 5) Wet | 55.7 | 31.3 | 28.4 | 18.5 | 4.4 | 3.7 | 8.8 | 29.0 | 35.4 | 70.0 | 67.3 | 77.2 | 429.7 |
| Wtd Avg. | 43.4 | 36.5 | 28.6 | 15.9 | 5.0 | 3.9 | 8.2 | 23.1 | 32.6 | 48.2 | 53.7 | 53.8 | 352.8 |

B. Surface Water Diversions Sub-Region (inflow)

source: CVGSM Sub-Region 6

| | Flow Path Not Affected Thousand Acre Feet | | | | | | | | | | | | |
|-------------|--|-----|-----|------|------|------|------|------|------|-----|-----|-----|-------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | 0.0 | 0.5 | 7.6 | 32.2 | 43.4 | 42.3 | 51.4 | 40.3 | 18.4 | 4.9 | 0.0 | 0.0 | 241.0 |
| 2) Dry | 0.0 | 0.1 | 1.6 | 25.2 | 47.1 | 55.4 | 62.2 | 49.7 | 20.8 | 6.7 | 0.1 | 0.0 | 268.9 |
| 3) B Norm | 0.0 | 0.1 | 3.1 | 27.0 | 49.9 | 56.3 | 63.3 | 50.6 | 21.0 | 6.0 | 0.0 | 0.0 | 277.4 |
| 4) A Norm | 0.0 | 0.0 | 0.0 | 21.0 | 43.4 | 58.3 | 63.1 | 50.7 | 22.9 | 3.6 | 0.0 | 0.0 | 263.0 |
| 5) Wet | 0.0 | 0.0 | 0.5 | 15.2 | 42.7 | 54.6 | 61.9 | 49.8 | 21.6 | 3.1 | 0.0 | 0.0 | 249.4 |
| Wtd Avg. | 0.0 | 0.1 | 2.2 | 22.9 | 45.4 | 54.0 | 61.1 | 48.8 | 21.0 | 4.8 | 0.0 | 0.0 | 260.3 |

C. Import Sub-Region (inflow)

source: CVGSM Sub-Region 6

| | Thousand Acre Feet | | | | | | | | | | | | |
|-------------|--------------------|-----|-----|------|------|------|------|------|-----|-----|-----|-----|-------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | 0.0 | 0.2 | 3.3 | 12.3 | 12.3 | 14.6 | 17.6 | 13.2 | 5.2 | 1.6 | 0.0 | 0.0 | 80.4 |
| 2) Dry | 0.0 | 0.0 | 0.7 | 8.1 | 13.6 | 18.6 | 21.3 | 16.0 | 6.3 | 2.3 | 0.0 | 0.0 | 87.0 |
| 3) B Norm | 0.0 | 0.0 | 1.2 | 8.8 | 14.9 | 19.5 | 22.5 | 17.0 | 6.7 | 2.0 | 0.0 | 0.0 | 92.5 |
| 4) A Norm | 0.0 | 0.0 | 0.0 | 6.7 | 13.2 | 20.7 | 23.2 | 17.5 | 7.4 | 0.8 | 0.0 | 0.0 | 89.5 |
| 5) Wet | 0.0 | 0.0 | 0.2 | 4.7 | 13.4 | 20.4 | 23.6 | 17.8 | 7.3 | 1.1 | 0.0 | 0.0 | 88.5 |
| Wtd Avg. | 0.0 | 0.0 | 0.9 | 7.6 | 13.6 | 19.1 | 22.0 | 16.6 | 6.7 | 1.6 | 0.0 | 0.0 | 88.1 |

D. Groundwater Pumping Sub-Region (inflow)

source: CVGSM Sub-Region 6

| source: CVGSM Sub-Region 6 | Thousand Acre Feet | | | | | | | | | | | | |
|----------------------------|--------------------|-----|------|------|------|-------|-------|------|------|------|------|------|-------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | -0.1 | 3.8 | 27.9 | 85.7 | 77.9 | 110.8 | 131.3 | 92.7 | 39.7 | 10.6 | 0.7 | -0.1 | 580.8 |
| 2) Dry | -0.1 | 1.3 | 7.6 | 43.5 | 63.1 | 102.8 | 119.3 | 83.8 | 33.6 | 12.3 | 0.8 | -0.1 | 467.9 |
| 3) B Norm | -0.1 | 1.3 | 8.5 | 43.5 | 64.3 | 100.0 | 116.4 | 82.0 | 32.8 | 10.3 | 0.4 | -0.1 | 459.3 |
| 4) A Norm | 0.0 | 0.3 | 1.0 | 32.9 | 55.2 | 102.2 | 117.3 | 82.6 | 33.6 | 7.8 | 0.5 | -0.1 | 433.2 |
| 5) Wet | 0.0 | 0.3 | 2.5 | 27.8 | 54.2 | 99.7 | 116.8 | 81.4 | 33.3 | 8.3 | -0.1 | -0.1 | 424.0 |
| Wtd Avg. | -0.1 | 1.2 | 8.0 | 42.8 | 61.5 | 102.3 | 119.2 | 83.7 | 34.1 | 9.9 | 0.4 | -0.1 | 463.0 |

E. ET Rain Sub-Region (outflow, irrecoverable)

source: CVGSM Sub-Region 6

| ET Rain Sub-Region (outflow, irrecoverable) source: CVGSM Sub-Region 6 | | | | | | | | | | | Flow Path Not Affected Thousand Acre Feet | | |
|---|------|------|------|------|------|-------|------|------|------|------|--|------|-------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | 13.8 | 19.3 | 17.2 | -8.3 | 3.4 | 3.6 | 1.3 | 8.1 | 15.6 | 35.7 | 20.6 | 14.1 | 144.3 |
| 2) Dry | 15.5 | 23.9 | 29.6 | 12.2 | -9.8 | -9.1 | 4.0 | 13.2 | 23.6 | 32.7 | 22.6 | 15.7 | 173.9 |
| 3) B Norm | 15.6 | 24.8 | 30.8 | 8.5 | -7.0 | -3.7 | 7.7 | 12.4 | 23.8 | 37.8 | 22.4 | 15.4 | 188.5 |
| 4) A Norm | 15.6 | 25.8 | 38.0 | 20.3 | -7.3 | -16.7 | 1.6 | 13.0 | 22.4 | 39.3 | 21.6 | 15.4 | 189.1 |
| 5) Wet | 16.0 | 25.5 | 35.8 | 30.7 | -4.6 | -20.7 | -3.2 | 14.8 | 22.8 | 42.5 | 24.1 | 16.0 | 199.7 |
| Wtd Avg. | 15.5 | 24.2 | 31.2 | 15.5 | -5.6 | -10.8 | 1.9 | 12.8 | 22.2 | 38.0 | 22.6 | 15.5 | 182.8 |

F. Runoff from Rain Sub-Region (outflow, irrecoverable)

source: CVGSM Sub-Region 6

| Runoff from Rain Sub-Region (outflow, irrecoverable) source: CVGSM Sub-Region 6 | | | | | | | | | | | Flow Path Not Affected Thousand Acre Feet | | |
|--|------|------|------|-----|-----|-----|-----|------|------|------|--|------|-------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | 7.6 | 9.1 | 12.5 | 2.1 | 0.3 | 0.0 | 0.0 | 3.9 | 7.8 | 8.9 | 5.7 | 6.0 | 63.8 |
| 2) Dry | 12.0 | 12.7 | 7.6 | 4.8 | 1.0 | 0.9 | 1.8 | 8.5 | 18.5 | 10.8 | 13.5 | 19.3 | 111.5 |
| 3) B Norm | 13.9 | 14.7 | 10.9 | 4.9 | 0.3 | 0.8 | 5.9 | 10.9 | 13.2 | 17.1 | 22.3 | 10.7 | 125.6 |
| 4) A Norm | 22.7 | 28.1 | 10.2 | 1.3 | 0.5 | 0.0 | 2.1 | 9.4 | 14.6 | 33.6 | 33.1 | 19.5 | 175.0 |
| 5) Wet | 26.9 | 11.8 | 8.9 | 3.7 | 0.3 | 0.0 | 2.1 | 13.3 | 16.0 | 36.2 | 30.6 | 38.1 | 187.9 |
| Wtd Avg. | 17.7 | 14.4 | 9.6 | 3.7 | 0.5 | 0.4 | 2.5 | 10.0 | 14.7 | 22.5 | 22.0 | 21.6 | 139.7 |

G. ETAW Sub-Region (outflow, irrecoverable)

source: CVGSM Sub-Region 6

| ETAW Sub-Region (outflow, irrecoverable) source: CVGSM Sub-Region 6 | | | | | | | | | | | Flow Path Not Affected Thousand Acre Feet | | |
|--|-----|-----|------|------|------|-------|-------|------|------|------|--|-----|-------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | 0.0 | 4.2 | 21.9 | 81.0 | 81.0 | 111.2 | 134.7 | 99.8 | 52.4 | 15.4 | 0.5 | 0.0 | 601.9 |
| 2) Dry | 0.0 | 1.0 | 8.4 | 60.5 | 94.2 | 123.9 | 132.0 | 94.6 | 44.4 | 18.9 | 0.7 | 0.0 | 578.7 |
| 3) B Norm | 0.0 | 0.5 | 8.0 | 64.1 | 91.4 | 118.5 | 128.3 | 95.4 | 44.2 | 13.6 | 0.3 | 0.0 | 564.4 |
| 4) A Norm | 0.0 | 0.0 | 1.0 | 52.4 | 91.7 | 131.5 | 134.4 | 94.8 | 45.6 | 8.9 | 0.5 | 0.0 | 560.8 |
| 5) Wet | 0.0 | 0.0 | 3.0 | 42.0 | 89.0 | 135.5 | 139.2 | 93.0 | 45.2 | 9.0 | 0.0 | 0.0 | 555.9 |
| Wtd Avg. | 0.0 | 0.9 | 7.5 | 57.2 | 90.0 | 125.7 | 134.1 | 95.0 | 45.8 | 13.0 | 0.4 | 0.0 | 569.6 |

H. Export Sub-Region (outflow, irrecoverable)

source: CVGSM Sub-Region 6

| source: CVGSM Sub-Region 6 | Thousand Acre Feet | | | | | | | | | | | | |
|----------------------------|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | N/A |
| 2) Dry | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | N/A |
| 3) B Norm | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | N/A |
| 4) A Norm | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | N/A |
| 5) Wet | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | N/A |
| Average | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | N/A |

I. Surface Runoff Sub-Region (outflow, recoverable)

source: CVGSM Sub-Region 6

| source: CVGSM Sub-Region 6 | Thousand Acre Feet | | | | | | | | | | | | |
|----------------------------|--------------------|-----|------|------|------|------|------|------|-----|-----|-----|-----|-------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | 0.0 | 0.5 | 15.9 | 50.0 | 41.9 | 47.1 | 55.2 | 35.9 | 7.6 | 1.6 | 0.0 | 0.0 | 255.8 |
| 2) Dry | 0.0 | 0.1 | 2.1 | 15.1 | 19.8 | 33.7 | 47.8 | 31.8 | 6.7 | 1.8 | 0.0 | 0.0 | 158.8 |
| 3) B Norm | 0.0 | 0.2 | 2.5 | 10.9 | 24.4 | 36.2 | 47.9 | 30.8 | 7.2 | 1.5 | 0.0 | 0.0 | 161.6 |
| 4) A Norm | 0.0 | 0.0 | 0.0 | 4.9 | 11.5 | 31.3 | 44.3 | 31.8 | 7.6 | 1.3 | 0.0 | 0.0 | 132.6 |
| 5) Wet | 0.0 | 0.0 | 0.2 | 3.9 | 13.7 | 24.7 | 39.7 | 30.9 | 7.0 | 1.2 | 0.0 | 0.0 | 121.5 |
| Average | 0.0 | 0.1 | 3.1 | 14.1 | 20.7 | 32.9 | 45.9 | 31.9 | 7.1 | 1.5 | 0.0 | 0.0 | 157.2 |

J. Percolation to Groundwater Sub-Region (outflow, recoverable)

source: CVGSM Sub-Region 6

| source: CVGSM Sub-Region 6 | Thousand Acre Feet | | | | | | | | | | | | |
|----------------------------|--------------------|-----|------|------|------|------|------|------|------|-----|------|------|-------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | 3.4 | 1.6 | 10.2 | 21.4 | 19.0 | 20.6 | 22.1 | 19.8 | 8.9 | 1.0 | 0.8 | 2.3 | 131.0 |
| 2) Dry | 5.0 | 3.5 | 2.1 | 5.6 | 9.7 | 18.6 | 22.4 | 22.4 | 10.4 | 1.9 | 2.8 | 7.2 | 111.5 |
| 3) B Norm | 5.5 | 4.0 | 4.0 | 7.0 | 12.2 | 18.8 | 24.6 | 21.6 | 8.5 | 4.4 | 7.0 | 4.0 | 121.7 |
| 4) A Norm | 10.7 | 7.8 | 0.8 | 2.6 | 6.0 | 15.4 | 22.7 | 21.9 | 10.2 | 6.0 | 10.4 | 8.6 | 122.9 |
| 5) Wet | 12.2 | 2.8 | 0.6 | 1.7 | 5.6 | 12.3 | 21.7 | 22.8 | 9.7 | 6.1 | 8.0 | 15.0 | 118.3 |
| Average | 7.8 | 3.7 | 2.9 | 6.4 | 9.7 | 16.5 | 22.6 | 21.9 | 9.6 | 4.1 | 6.0 | 8.5 | 119.7 |

K. Evaporation Flows Sub-Region

source: = 0.02 * (Step 5B + 5C - 5H)

= 0.02 * (Surface Water Diversion + Import - Export)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| 1) Critical | 0.0 | 0.0 | 0.2 | 0.9 | 1.1 | 1.1 | 1.4 | 1.1 | 0.5 | 0.1 | 0.0 | 0.0 | 6.4 |
| 2) Dry | 0.0 | 0.0 | 0.0 | 0.7 | 1.2 | 1.5 | 1.7 | 1.3 | 0.5 | 0.2 | 0.0 | 0.0 | 7.1 |
| 3) B Norm | 0.0 | 0.0 | 0.1 | 0.7 | 1.3 | 1.5 | 1.7 | 1.4 | 0.6 | 0.2 | 0.0 | 0.0 | 7.4 |
| 4) A Norm | 0.0 | 0.0 | 0.0 | 0.6 | 1.1 | 1.6 | 1.7 | 1.4 | 0.6 | 0.1 | 0.0 | 0.0 | 7.0 |
| 5) Wet | 0.0 | 0.0 | 0.0 | 0.4 | 1.1 | 1.5 | 1.7 | 1.4 | 0.6 | 0.1 | 0.0 | 0.0 | 6.8 |
| Wtd Avg. | 0.0 | 0.0 | 0.1 | 0.6 | 1.2 | 1.5 | 1.7 | 1.3 | 0.6 | 0.1 | 0.0 | 0.0 | 7.0 |

L. Sub-Region Water Balance

source: = Step 5.(A + B + C + D) - Step5. (E + F + G + H + I + J + K)

= (Rain + Surface Water Diversions + Import + Groundwater Pumping) - (ET Rain +
Runoff from Rain + ETAW + Export + Surface & Groundwater Return + Evaporation)

| | Thousand Acre Feet | | | | | | | | | | | | |
|-------------|--------------------|------|-------|-------|------|-------|-------|-------|------|-------|------|-----|-------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | 3.3 | 1.9 | -6.5 | -7.9 | -7.9 | -11.5 | -13.4 | -10.7 | -8.6 | -20.5 | -2.4 | 6.4 | -77.8 |
| 2) Dry | 0.5 | -8.3 | -14.8 | -4.8 | 13.7 | 12.4 | -0.3 | -0.3 | -6.5 | -14.9 | 2.4 | 9.4 | -11.4 |
| 3) B Norm | 4.3 | -4.8 | -13.1 | 0.7 | 10.6 | 7.9 | -0.2 | 0.2 | -6.5 | -16.6 | 2.2 | 7.3 | -8.1 |
| 4) A Norm | 5.2 | -2.4 | -20.6 | -9.3 | 13.7 | 19.4 | 4.9 | 1.0 | -3.1 | -10.6 | 8.4 | 9.8 | 16.5 |
| 5) Wet | 0.6 | -8.6 | -17.0 | -16.1 | 9.5 | 25.1 | 10.0 | 1.9 | -3.7 | -12.8 | 4.5 | 8.2 | 1.6 |
| Wtd Avg. | 2.3 | -5.6 | -14.8 | -8.1 | 9.0 | 13.2 | 1.8 | -0.7 | -5.5 | -14.8 | 3.1 | 8.3 | -11.8 |

M. Applied Water Ratio Sub-Region

source: = Step 5G / Step 5 (B + C + D - H)

= ETAW/(Surface Water Diversions + Import + Groundwater Pumping - Export)

| | Thousand Acre Feet | | | | | | | | | | | | |
|-------------|--------------------|------|------|------|------|------|------|------|------|------|------|------|-------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | 0.00 | 0.93 | 0.56 | 0.62 | 0.61 | 0.66 | 0.67 | 0.68 | 0.83 | 0.90 | 0.68 | 0.00 | ##### |
| 2) Dry | 0.00 | 0.72 | 0.84 | 0.79 | 0.76 | 0.70 | 0.65 | 0.63 | 0.73 | 0.89 | 0.82 | 0.00 | ##### |
| 3) B Norm | 0.00 | 0.36 | 0.63 | 0.81 | 0.71 | 0.67 | 0.63 | 0.64 | 0.73 | 0.74 | 0.90 | 0.00 | ##### |
| 4) A Norm | 0.00 | 0.00 | 1.01 | 0.86 | 0.82 | 0.73 | 0.66 | 0.63 | 0.71 | 0.73 | 0.93 | 0.00 | ##### |
| 5) Wet | 0.00 | 0.00 | 0.94 | 0.88 | 0.81 | 0.78 | 0.69 | 0.62 | 0.73 | 0.73 | 0.00 | 0.00 | ##### |
| Wtd Avg. | 0.0 | 0.4 | 0.8 | 0.8 | 0.8 | 0.7 | 0.7 | 0.6 | 0.7 | 0.8 | 0.6 | 0.0 | N/A |

N. Groundwater Check Sub-Region

source: = Step 5 (J - D)

= Groundwater Return Flows - Groundwater Pumping

| | Thousand Acre Feet | | | | | | | | | | | | |
|-------------|--------------------|------|-------|-------|-------|-------|--------|-------|-------|-------|-----|------|--------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | 3.4 | -2.2 | -17.7 | -64.3 | -58.9 | -90.2 | -109.1 | -72.9 | -30.8 | -9.6 | 0.0 | 2.4 | -449.8 |
| 2) Dry | 5.0 | 2.2 | -5.5 | -37.9 | -53.5 | -84.2 | -96.9 | -61.3 | -23.2 | -10.4 | 2.0 | 7.3 | -356.4 |
| 3) B Norm | 5.6 | 2.8 | -4.5 | -36.5 | -52.1 | -81.3 | -91.7 | -60.4 | -24.3 | -6.0 | 6.7 | 4.1 | -337.6 |
| 4) A Norm | 10.7 | 7.6 | -0.2 | -30.3 | -49.2 | -86.8 | -94.6 | -60.7 | -23.5 | -1.8 | 9.9 | 8.7 | -310.3 |
| 5) Wet | 12.2 | 2.5 | -2.0 | -26.1 | -48.6 | -87.4 | -95.1 | -58.6 | -23.6 | -2.1 | 8.1 | 15.0 | -305.7 |
| Wtd Avg. | 7.9 | 2.5 | -5.1 | -36.5 | -51.9 | -85.7 | -96.6 | -61.7 | -24.6 | -5.8 | 5.6 | 8.5 | -343.3 |

6. Idealized Agricultural Potential

A. Export Adjustment

0% of Export (Step 5H.) water is available for flow/timing changes in Sub-Region

note: Import (Step 5C) and Export (Step 5H) are in the water balance. In this Step (7D) Export water is considered water that flows through districts in Sub-Regions 4, 5, and 7. This water is available to make flow/timing changes

| source: CVGSM Sub-Region | | | | | | | | | | | | Thousand Acre Feet | |
|--------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--------------------|-------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | --- | --- | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | --- | --- | 0.0 |
| 2) Dry | --- | --- | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | --- | --- | 0.0 |
| 3) B Norm | --- | --- | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | --- | --- | 0.0 |
| 4) A Norm | --- | --- | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | --- | --- | 0.0 |
| 5) Wet | --- | --- | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | --- | --- | 0.0 |
| Wtd Avg. | N/A | N/A | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | N/A | N/A | 0.0 |

B. Idealized Agricultural Potential

source: = Step 5 ((B + C + D) + Step 6A. - Step 5 (G + H))

= Surface Water Diversions + Import + Groundwater Diversions) - (ETAW + Export + Export Adjustment)

| | Thousand Acre Feet | | | | | | | | | | | | |
|-------------|--------------------|-----|------|------|------|------|------|------|------|-----|-----|-----|-------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | --- | --- | 16.9 | 49.2 | 52.6 | 56.5 | 65.6 | 46.4 | 10.9 | 1.7 | --- | --- | 299.9 |
| 2) Dry | --- | --- | 1.5 | 16.3 | 29.6 | 52.9 | 70.8 | 54.8 | 16.4 | 2.4 | --- | --- | 244.7 |
| 3) B Norm | --- | --- | 4.8 | 15.1 | 37.7 | 57.3 | 73.9 | 54.1 | 16.3 | 4.8 | --- | --- | 263.9 |
| 4) A Norm | --- | --- | 0.0 | 8.2 | 20.1 | 49.7 | 69.1 | 56.0 | 18.3 | 3.3 | --- | --- | 224.7 |
| 5) Wet | --- | --- | 0.2 | 5.7 | 21.3 | 39.2 | 63.2 | 56.0 | 16.9 | 3.4 | --- | --- | 205.9 |
| Wtd Avg. | N/A | N/A | 3.6 | 16.1 | 30.5 | 49.7 | 68.2 | 54.1 | 16.1 | 3.2 | N/A | N/A | 241.4 |

7. Achievable Agricultural Potential

A. Farm Demand

assumes farm loss fraction of 0.13 for Sub-Region , values vary by SubRegion

source: = ETAW / Farm High (1- loss fraction)

| | Thousand Acre Feet | | | | | | | | | | | | |
|-------------|--------------------|-----|------|------|-------|-------|-------|-------|------|------|-----|-----|-------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | --- | --- | 25.1 | 93.1 | 93.1 | 127.8 | 154.8 | 114.7 | 60.2 | 17.7 | --- | --- | 686.5 |
| 2) Dry | --- | --- | 9.6 | 69.6 | 108.3 | 142.5 | 151.7 | 108.8 | 51.0 | 21.7 | --- | --- | 663.2 |
| 3) B Norm | --- | --- | 9.2 | 73.7 | 105.1 | 136.3 | 147.4 | 109.7 | 50.8 | 15.6 | --- | --- | 647.8 |
| 4) A Norm | --- | --- | 1.2 | 60.2 | 105.4 | 151.2 | 154.5 | 109.0 | 52.4 | 10.2 | --- | --- | 644.0 |
| 5) Wet | --- | --- | 3.5 | 48.2 | 102.3 | 155.8 | 160.0 | 106.9 | 52.0 | 10.4 | --- | --- | 639.0 |
| Wtd Avg. | --- | --- | 8.6 | 65.8 | 103.4 | 144.5 | 154.1 | 109.2 | 52.6 | 15.0 | --- | --- | 653.2 |

B. Groundwater Pumping after System Improvements

Existing Farm Efficiency for Sub-Region = 0.70
 source: = $(1 - 0.7 * (1/0.7 - 1/(1 - \text{Farm Loss Fraction}))) * \text{Groundwater Pumping}$

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|-------------|-----|-----|------|------|------|------|-------|------|------|-----|-----|-----|-------|
| 1) Critical | --- | --- | 22.4 | 68.9 | 62.7 | 89.2 | 105.6 | 74.6 | 31.9 | 8.5 | --- | --- | 463.8 |
| 2) Dry | --- | --- | 6.1 | 35.0 | 50.8 | 82.7 | 96.0 | 67.4 | 27.1 | 9.9 | --- | --- | 374.9 |
| 3) B Norm | --- | --- | 6.8 | 35.0 | 51.8 | 80.5 | 93.6 | 65.9 | 26.4 | 8.3 | --- | --- | 368.4 |
| 4) A Norm | --- | --- | 0.8 | 26.5 | 44.4 | 82.2 | 94.3 | 66.5 | 27.1 | 6.3 | --- | --- | 348.0 |
| 5) Wet | --- | --- | 2.0 | 22.4 | 43.6 | 80.2 | 94.0 | 65.5 | 26.8 | 6.6 | --- | --- | 341.1 |
| Wtd Avg. | --- | --- | 6.4 | 34.5 | 49.5 | 82.3 | 95.9 | 67.3 | 27.5 | 7.9 | --- | --- | 371.4 |

C. Farm Demand not met by Groundwater Pumping

source: = Step 7.A - Step 7.B
 = Farm Demand - Groundwater Pumping

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|-------------|-----|-----|-----|------|------|------|------|------|------|------|-----|-----|-------|
| 1) Critical | --- | --- | 2.7 | 24.2 | 30.4 | 38.7 | 49.2 | 40.1 | 28.3 | 9.1 | --- | --- | 222.7 |
| 2) Dry | --- | --- | 3.5 | 34.6 | 57.5 | 59.7 | 55.8 | 41.4 | 24.0 | 11.8 | --- | --- | 288.2 |
| 3) B Norm | --- | --- | 2.4 | 38.7 | 53.3 | 55.8 | 53.8 | 43.8 | 24.4 | 7.3 | --- | --- | 279.5 |
| 4) A Norm | --- | --- | 0.4 | 33.7 | 61.0 | 69.0 | 60.1 | 42.5 | 25.3 | 3.9 | --- | --- | 295.9 |
| 5) Wet | --- | --- | 1.4 | 25.9 | 58.7 | 75.5 | 66.0 | 41.4 | 25.2 | 3.7 | --- | --- | 297.9 |
| Wtd Avg. | --- | --- | 2.1 | 31.3 | 53.9 | 62.2 | 58.2 | 41.9 | 25.2 | 7.1 | --- | --- | 281.8 |

D. Water Supplier Delivery to Meet Farm Demand

assumes district loss fraction of 0.08
 source: = Step 7C / District High (1- loss fraction)
 = Farm Demand not met by Groundwater Pumping/(1 - 0.08)

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|-------------|-----|-----|-----|------|------|------|------|------|------|------|-----|-----|-------|
| 1) Critical | --- | --- | 3.0 | 26.3 | 33.1 | 42.0 | 53.5 | 43.6 | 30.7 | 9.9 | --- | --- | 242.1 |
| 2) Dry | --- | --- | 3.8 | 37.6 | 62.5 | 64.9 | 60.6 | 45.0 | 26.0 | 12.8 | --- | --- | 313.3 |
| 3) B Norm | --- | --- | 2.6 | 42.1 | 58.0 | 60.6 | 58.5 | 47.6 | 26.5 | 7.9 | --- | --- | 303.8 |
| 4) A Norm | --- | --- | 0.4 | 36.6 | 66.3 | 75.0 | 65.4 | 46.2 | 27.5 | 4.3 | --- | --- | 321.7 |
| 5) Wet | --- | --- | 1.6 | 28.1 | 63.8 | 82.1 | 71.8 | 45.0 | 27.4 | 4.1 | --- | --- | 323.8 |
| Wtd Avg. | --- | --- | 2.3 | 34.0 | 58.6 | 67.6 | 63.3 | 45.5 | 27.4 | 7.7 | --- | --- | 306.4 |

E. Achievable Agricultural Potential

source = Step 5.(B + C - H) + Step 6A - Step 7D.
 = Surface Water Diversions + Import - Export + Export Adjustment - Water Supplier
 Delivery to Meet Farm Demand

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|-------------|-----|-----|-----|------|------|------|------|------|-----|-----|-----|-----|-------|
| 1) Critical | --- | --- | 7.9 | 18.3 | 22.6 | 14.9 | 15.5 | 9.9 | 0.0 | 0.0 | --- | --- | 89.1 |
| 2) Dry | --- | --- | 0.0 | 0.0 | 0.0 | 9.1 | 22.9 | 20.7 | 1.1 | 0.0 | --- | --- | 53.7 |
| 3) B Norm | --- | --- | 1.7 | 0.0 | 6.8 | 15.2 | 27.3 | 20.0 | 1.1 | 0.1 | --- | --- | 72.3 |
| 4) A Norm | --- | --- | 0.0 | 0.0 | 0.0 | 4.0 | 20.9 | 22.0 | 2.8 | 0.1 | --- | --- | 49.8 |
| 5) Wet | --- | --- | 0.0 | 0.0 | 0.0 | 0.0 | 13.8 | 22.6 | 1.5 | 0.1 | --- | --- | 38.0 |
| Wtd Avg. | --- | --- | 1.4 | 2.4 | 4.3 | 7.7 | 19.8 | 19.9 | 1.3 | 0.1 | --- | --- | 56.8 |

F. Groundwater Check after System Improvements

$$\text{source} = (0.13 * 0.80 * \text{ETAW}) + (0.04 * (\text{Farm Demand w/o Groundwater} - \text{Water Supplier Delivery})) - \text{Groundwater Pumping}$$

| | Thousand Acre Feet | | | | | | | | | | | | |
|-------------|--------------------|-----|-------|-------|-------|-------|--------|-------|-------|-------|-----|-----|--------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| 1) Critical | --- | --- | -25.6 | -77.3 | -69.6 | -99.4 | -117.4 | -82.4 | -34.3 | -9.0 | --- | --- | -515.1 |
| 2) Dry | --- | --- | -6.7 | -37.3 | -53.5 | -90.1 | -105.7 | -74.1 | -29.1 | -10.4 | --- | --- | -407.0 |
| 3) B Norm | --- | --- | -7.7 | -37.0 | -55.0 | -87.9 | -103.2 | -72.2 | -28.3 | -8.9 | --- | --- | -400.2 |
| 4) A Norm | --- | --- | -0.9 | -27.6 | -45.9 | -88.7 | -103.5 | -72.9 | -29.0 | -6.9 | --- | --- | -375.3 |
| 5) Wet | --- | --- | -2.2 | -23.5 | -45.2 | -85.9 | -102.6 | -71.9 | -28.7 | -7.3 | --- | --- | -367.1 |
| Wtd Avg. | --- | --- | -7.2 | -37.0 | -52.4 | -89.4 | -105.5 | -73.9 | -29.5 | -8.5 | --- | --- | -403.4 |

8. Quantifiable Objective

$$\text{source} = \min(\text{Step 3A Wtd Avg}, \text{Step 7E})$$

| | Thousand Acre Feet | | | | | | | | | | | | |
|---------|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| Wtd Avg | --- | --- | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | --- | --- | 0.3 |